RETRACTABLE EXHAUST LINER SEGMENT FOR GAS TURBINE ENGINES

BACKGROUND

The present disclosure relates to gas turbine engines, and more particularly to an exhaust liner therefor.

Some environments require a propulsion system in which an engine or exhaust system may be dropped or raised from an airframe for maintenance within the shadow of the airframe.

SUMMARY

A retractable exhaust liner segment according to an exemplary aspect of the present disclosure includes a first retractable exhaust liner segment defines a first flange. A second retractable exhaust liner segment defines a second flange. A fastener assembly received by the first flange and the second flange to mount the first retractable exhaust liner segment to the second retractable exhaust liner segment.

A propulsion system according to an exemplary aspect of the present disclosure includes a retractable exhaust liner segment between a gas turbine engine and an exhaust duct.

A method of maintaining a gas turbine engine according to an exemplary aspect of the present disclosure includes moving a retractable exhaust liner segment along an axis; and moving one of a gas turbine engine or an exhaust liner transverse to the axis.

BRIEF DESCRIPTION OF THE DRAWINGS

Various features will become apparent to those skilled in the art from the following detailed description of the disclosed non-limiting embodiment. The drawings that accompany the detailed description can be briefly described as follows:

FIG. **1** is a general top perspective of an exemplary aircraft with a propulsion system for use with the present disclosure;

FIG. **2** is a general side sectional view of the propulsion system;

FIG. **3** is a general side sectional view of the propulsion system with a retractable exhaust liner segment in a closed position;

FIG. **4** is a general side sectional view of the propulsion system with a retractable exhaust liner segment in an open position;

FIG. **5** is a side view of the retractable exhaust liner segment;

FIG. **6** is a plan view of a flange of the retractable exhaust liner segment;

FIG. **7** is a side view of a flange of the retractable exhaust liner segment showing a fastener assembly according to one non-limiting embodiment;

FIG. **8** is a side view of a flange of the retractable exhaust liner segment according to another non-limiting embodiment;

FIG. **9** is a side view of a locating feature of the retractable exhaust liner segment according to one non-limiting embodiment;

FIG. **10** is a side view of a locating feature of the retractable exhaust liner segment according to another non-limiting embodiment;

FIG. **11** is a side view of a flange of the retractable exhaust liner segment showing a fastener assembly according to another non-limiting embodiment;

FIG. **12** is a plan view of a flange of one segment of the retractable exhaust liner segment of FIG. **11**; and

FIG. **13** is a plan view of a flange of one segment of the retractable exhaust liner segment of FIG. **11**.

DETAILED DESCRIPTION

FIG. **1** schematically illustrates an aircraft **10**. Some aircraft embed the engines within the vehicle planform to provide an effective balance of aero-performance, packaging, payload integration and survivability. The aircraft **10** in the disclosed non-limiting embodiment is schematically illustrated as a common air vehicle planform, however, it should be appreciated that any aircraft or vehicle will benefit herefrom and that the planform should not be considered limiting.

The aircraft **10** generally includes an airframe **12** and a propulsion system **14**. The propulsion system **14** may be embedded within the airframe **12** and include an exhaust liner **16** and a gas turbine engine **20** along a central longitudinal engine axis A. The exhaust liner **16** and engine **20** are separately mounted within the airframe **12** and each is separately removable within the "shadow" of the airframe **12** via a retractable exhaust liner segment **18**. That is, each may be removed and replaced vertically from the airframe **12** with respect to the ground rather than axially along the engine axis A. The retractable exhaust liner segment **18** selectively provides axial installation clearances to avoid damage to engine flanges yet assures a desired backpressure seal when installed.

FIG. **2** schematically illustrates the exhaust liner **16** and the gas turbine engine **20**. The exhaust liner **16** may be non-linear and/or transition to non-circular to suit airframe requirements. That is, the exhaust liner **16** may be contoured to at least partially extend off the axis A. The exhaust liner **16** may be of a linear or non-linear shape within an outer exhaust duct **32**D and may include a nozzle section **16**N. The nozzle section **16**N may include various fixed, variable, convergent/divergent, two-dimensional and three-dimensional nozzle systems.

The gas turbine engine **20** is disclosed herein as a two-spool turbofan that generally incorporates a fan section **22**, a compressor section **24**, a combustor section **26**, a turbine section **28**, and an augmenter section **30**. The sections are defined along the central longitudinal engine axis A. Although depicted as an augmented low bypass gas turbine engine in the disclosed non-limiting embodiment, it should be understood that the concepts described herein are applicable to other gas turbine engines including non-augmented engines, geared architecture engines, direct drive turbofans, turboshaft engines, three-spool architecture engines and others.

The compressor section **24**, the combustor section **26** and the turbine section **28** are generally referred to as the engine core. The fan section **22** and a low pressure turbine **34** of the turbine section **28** are coupled by a first shaft **36** to define a low spool. The compressor section **24** and a high pressure turbine **38** of the turbine section **28** are coupled by a second shaft **40** to define a high spool.

An outer engine case structure **42** and an inner engine structure **44** define a generally annular secondary flow path **46** around a core flow path **48** of the engine core. It should be understood that various structure within the engine may define the outer engine case structure **42** and the inner engine structure **44** which essentially define an exoskeleton to support the core engine therein. It should be appreciated that the inner engine structure **44** as defined herein may include a turbine exhaust case, a stub liner, an augmenter liner, or any